

## TECHNICAL DATA SHEET

### GRILON F 47 HNL NATURAL 6020

#### General product description

Grilon F 47 HNL natural 6020 is a nucleated, high viscosity polyamide 6.

This product exhibits the following features:

- Good mechanical properties
- Good barrier against oils and fats
- Good heat thermal stability

#### Application examples

Grilon F 47 HNL natural 6020 is suitable for the production of tubes and profiles.

Grilon F 47 HNL natural 6020 is used as mandrel.

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## PROPERTIES

### Thermal Properties

		Standard	Unit	Grilon F 47 HNL natural 6020
Melting point	DSC	ISO 11357	°C	222
Melt volume rate (MVR)	275°C / 5 kg	ISO 1133	cm³/10 min	15

### General Properties

Density		ISO 1183	g/cm³	1.14
Water absorption	23°C/sat.	ISO 62	%	9
Moisture absorption	23°C/50 % RH	ISO 62	%	3
Shrink <sup>1)</sup>		EMS	%	-
Gloss	60°	ISO 2813	-	100
Haze		ISO 14782	%	-

### Barrier Properties (50 µm films)

O <sub>2</sub> -Transmission rate	23°C/ 0 % RH	DIS/ISO 15105-1	cm³/m² 24h bar	25
	23°C/85 % RH		cm³/m² 24h bar	50
CO <sub>2</sub> -Transmission rate	23°C/ 0 % RH	DIS/ISO 15105-2	cm³/m² 24h bar	80
	23°C/85 % RH		cm³/m² 24h bar	250
Moisture vapour transmission rate	23°C/85 % RH	DIS/ISO 15106-1	g/m² 24h	15

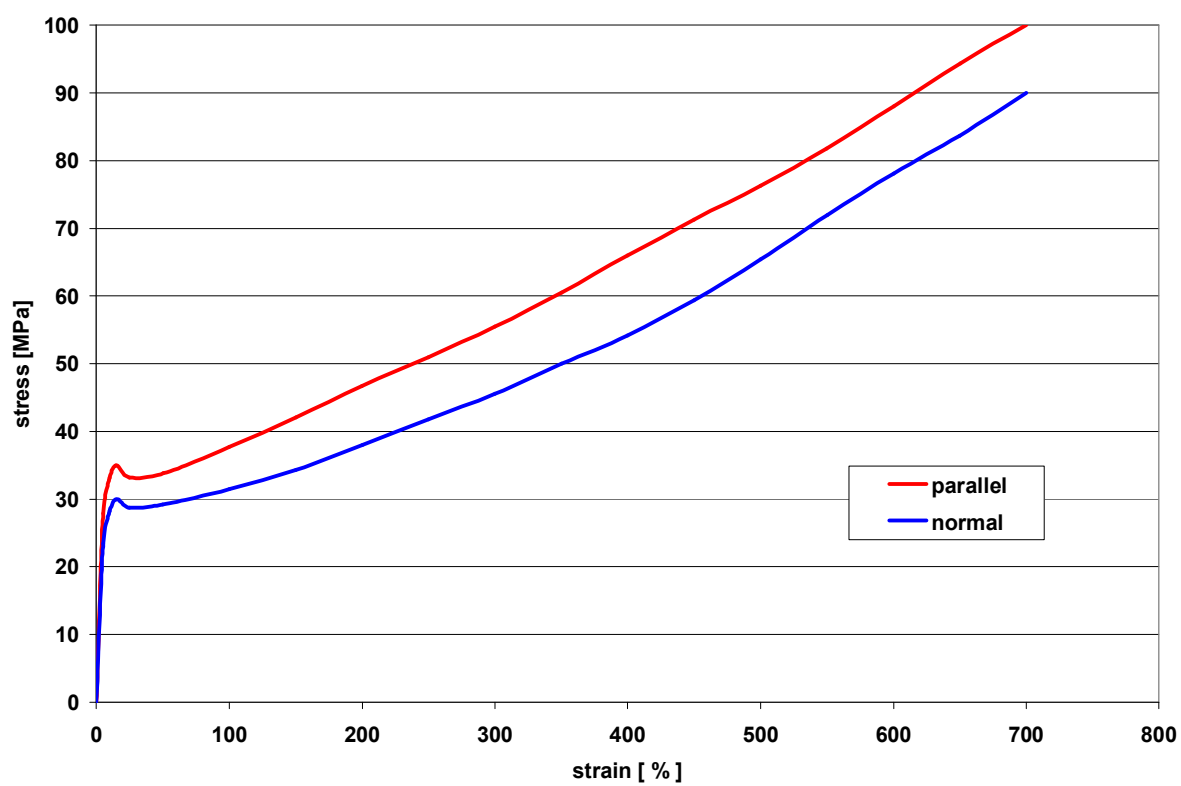
### Mechanical Properties

Tensile E-Modulus		ISO 527-2	MPa	750
Stress at yield	parallel	ISO 527-3	MPa	35
	normal			30
Strain at yield	parallel	ISO 527-3	%	15
	normal			15
Stress at break	parallel	ISO 527-3	MPa	100
	normal			90
Strain at break	parallel	ISO 527-3	%	700
	normal			700
Tear resistance	parallel	ISO 6383-1	N/mm	30
	normal			30
Elmendorf tear resistance	parallel	ISO 6383-2	N	10
	normal			10
Dart drop impact	A	ISO 7765-1	g	-
	B			-
Gelboflectest	900 cycles	EMS	holes/ m²	900
Dynamic Coefficient of friction	parallel	ISO 8295	-	0.25

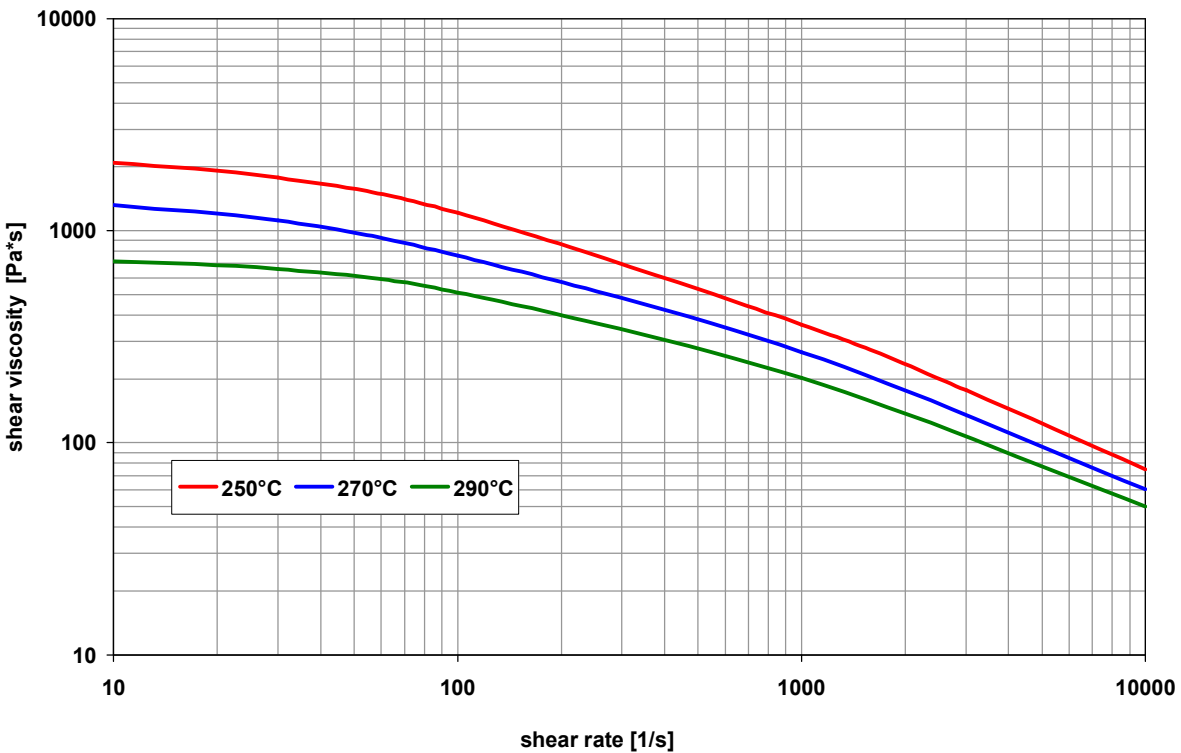
Product nomenclature acc. ISO 1874: PA6, FHS, 32-030/N

<sup>1)</sup> 80 µm film applied on 160 µm Iononmer, biaxially oriented at 70°C (draw ratio 2:1), afterwards shrinkage in water at 85°C

Stress & Strain Grilon F 47 HNL natural 6020



Viscosity function Grilon F 47 HNL natural 6020



## Processing information for the extrusion of Grilon F 47 HNL natural 6020

This technical data sheet for Grilon F 47 HNL natural 6020 provides you with useful information on material preparation, machine requirements and processing.

### MATERIAL PREPARATION

Grilon F 47 HNL natural 6020 is delivered dry and ready for processing in sealed, air tight packaging. Predrying is not necessary.

#### Storage

Sealed, undamaged bags can be kept over a long period of time in storage facilities which are dry, protected from the influence of weather and where the bags can be protected from damage.

#### Handling and safety

Detailed information can be obtained from the "Material Safety Data Sheet" (MSDS) which can be requested with every material order.

#### Drying

Grilon F 47 HNL natural 6020 is dried and packed with a moisture content of less than 0.10 %. The processing of moist material reduces the optical and mechanical quality of the application. A too high moisture content can result in fish eyes, streaks and brittleness.

Drying can be done as follows:

##### Desiccant dryer

Temperature:	max. 80°C
Time:	4 - 12 hours
Dew point of the dryer:	-30°C

##### Vacuum oven

Temperature:	max. 100°C
Time:	4 - 12 hours

#### Drying time

If there is only slight evidence of foaming of the melt or just traces of silver streaks on the part, then the above mentioned minimal drying time will be sufficient. Material, which is stored in open over days, which shows strong foaming, is unusually easy flowing melt or streaks on the article, then the maximal drying time is required.

#### Drying temperature

Polyamides are subjected to the affects of oxidation at temperatures above 80°C in the presence of oxygen. Visible yellowing of the material is an indication of oxidation. Hence temperatures above 80°C for desiccant dryers and temperatures above 100°C for vacuum ovens should be avoided.

At longer residence times (over 1 hour) hopper heating or a hopper dryer (80°C) is useful.

### MACHINE REQUIREMENTS

Grilon F 47 HNL natural 6020 can be processed economically and without problems on all extrusion lines suitable for polyamides.

#### Screw

Wear protected, Universal 3 zone screws are recommended.

##### Screw

Length:	24 D - 30 D
Compression ration:	2.5 - 3.5

#### Heating

At least three separately controllable heating zones, capable of reaching cylinder temperatures of up to 270°C are recommended. The cylinder flange and adapter must be able to be heated.

### PROCESSING

#### Temperatures

For the start up of processing Grilon F 47 HNL natural 6020 the following parameters can be recommended:

##### Temperatures

Hopper	15 - 60°C
Zone 1	240 - 250°C
Zone 2	240 - 255°C
Zone 3	245 - 265°C
Adapter	245 - 265°C
Mould	245 - 265°C
Die	250 - 265°C
Melt	250 - 265°C

In cases where the use of grooved feed zones is employed it is recommended to temper this zone between 80 and 100°C.

## CUSTOMER SERVICES

EMS-GRIVORY is a specialist in polyamide synthesis and the processing of these materials. Our customer services are not only concerned with the manufacturing and supply of engineering thermoplastics but also provide full technical support including:

- Rheological design calculation / FEA
- Prototype tooling
- Material selection
- Processing support
- Mould and component design

We are happy to advise you. Simply call one of our sales offices.

The recommendations and data given are based on our experience to date, however, no liability can be assumed in connection with their usage and processing.

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This version replaces all previous product specific data sheets

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